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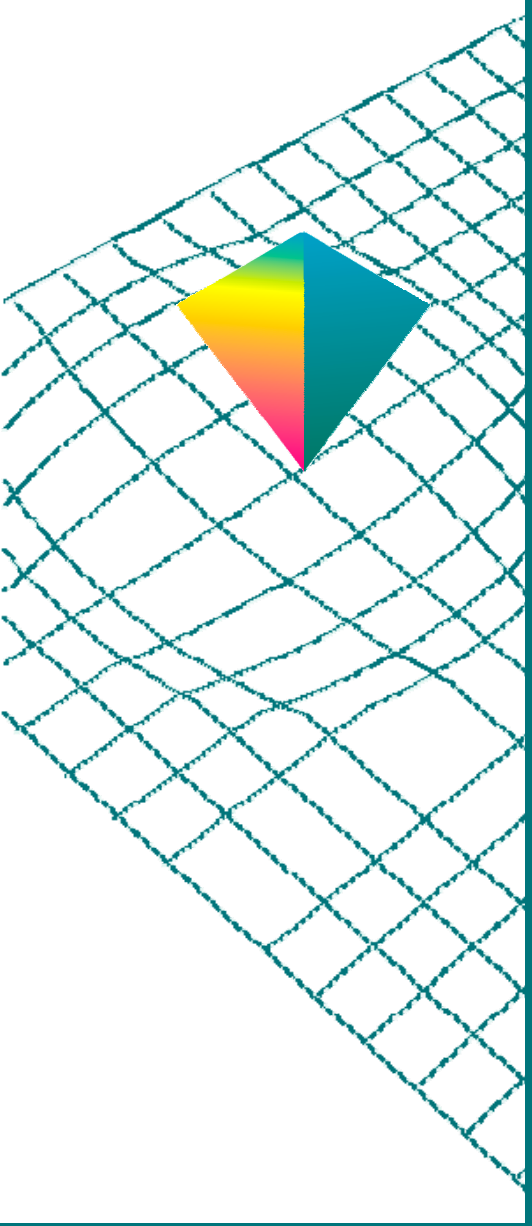

Maschinenbau von Makro bis Nano / Mechanical Engineering from Macro to Nano

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V. Musalimov / J. Kopytenko

The Design of MEMS- Magnitometers' Sensitive Elements with Piezoactuator

As far as we know, in all magnetometer's design on mechanical basis, elastic elements and film plates are usually used as sensitive elements on which constant magnets are attached.

In the given paper we represent the result of our investigation concerning the registration of super weak magnetic fields at mesolevel which is connected with MEMS systems. A turned-over pendulum is made according to MEMS technology, and the actuator creates of the pendulum base's vibration of high frequency. As a result of it, the given system provides sensibility by two oders greater than sensibility of classical elastic elements, and what is more, that design increases durability of these elements at dynamic loadings.

The sensitive element of the magnetometor's sensor (Figure 1) which is made in the form of a core 1 and its bottom end is connected with the base 2 by hinges, the magnetic element 3 is rigidly fixed on the core 1 , besides that, the magnetic element 3 can be attached to any point along the length of the core 1. the base 2 is erected on the elastic support 4. the base 2 is rigidly connected with the actuator 5 with the output of the monitoring block 6 which input connected with the output of the monitoring block 7. The optical system consists of the source of the luminous radiation 8 and the mirrow 9, rigidly fixed on the magnetic element 3 and the detector of the luminous radiation 10. The source of luminous radiation 8 is connected with the output 2 of the monitoring block 7. The detector of luminous radiation 10 is connected with the input 3 of the monitoring block7. The core 1 is initially deviated from its vertical axis and bears against on the edges of the hinge's groove of the base 2 . In the given paper we try to show some results of our systematical investigation of the dynamics of the magnetometric system in an alternative magnetic field.

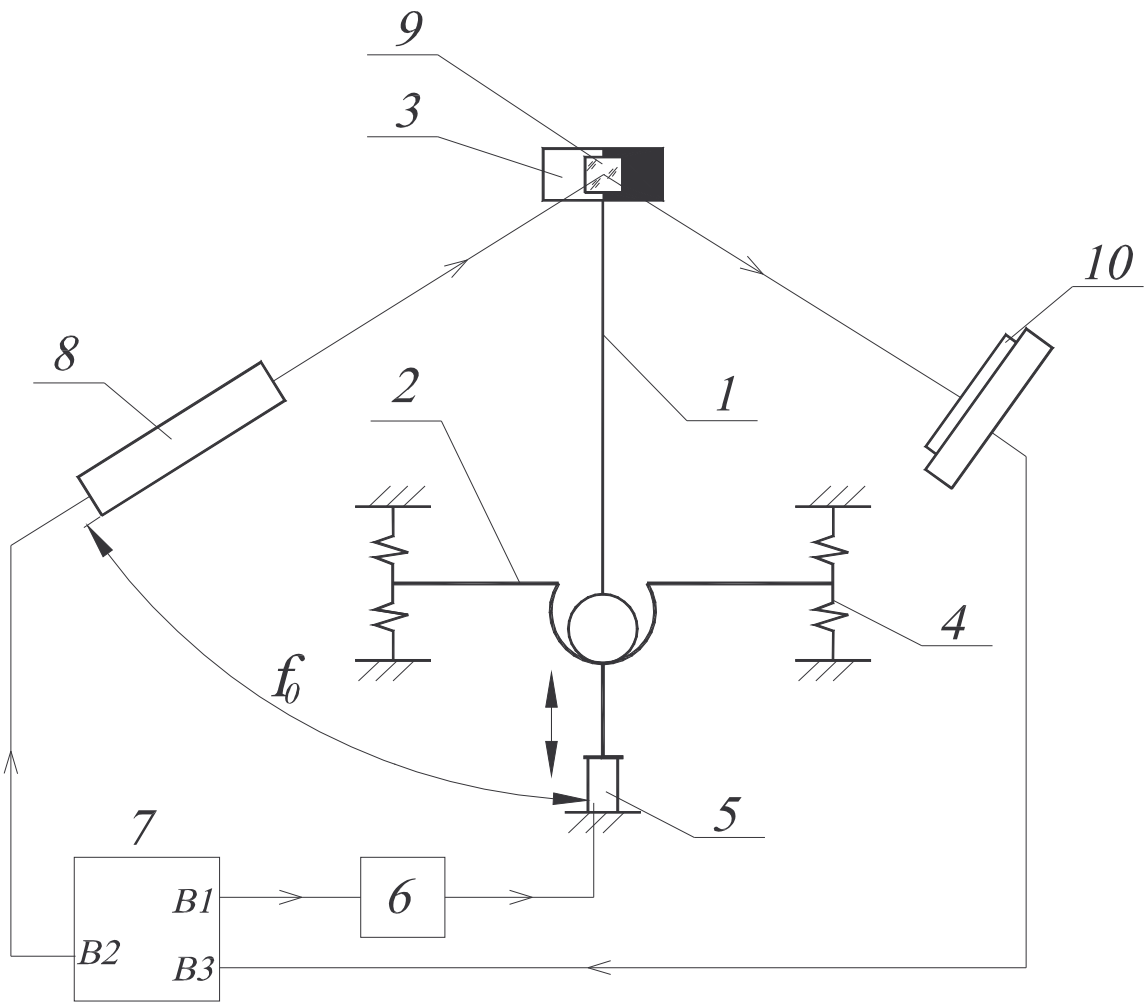

Figure 1 Principal scheme of Magnitometer

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